On-Board Mining in the Sensor Web

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Abstract
The Information Technology and Systems Center (ITSC) at The University of Alabama in Huntsville (UAH) has designed and is now developing an innovative processing framework aimed at assisting science users exploit the unique constraints and characteristics of the on-board satellite data and information environment. The Environment for On-Board Processing (EVE) system will serve as a proof-of-concept of advanced information systems technology for remote sensing platforms. Because data will be processed as it is collected, such a system will produce custom data products on-board and in real-time. First, the EVE editor allows science users to build processing plans, which are compatible with the constraints of on-board computing environments. The EVE on-board, real-time processing infrastructure in turn, will upload, schedule, and control the execution of these plans. Operations within the plans provide capabilities focused on the areas of autonomous data mining, classification and feature extraction using both streaming and buffered data sources. These will contribute to science research applications, including natural hazard detection and prediction, fusion of multi-sensor measurements, intelligent sensor control, and the generation of customized data products for direct distribution to users. A ground-based testbed is being created to provide testing of EVE and associated Earth Science applications in a heterogeneous embedded hardware and software environment.